O I P E
DEC 3 0 2002
PATENT & TRADEMARK OFFICE

1 of 3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

#25/W.M.
1/7/03

In re Patent Application of K. Aratani et al.	)	Group Art Unit: 1753
Application No. 09/429,719	)	
	)	Examiner: R. McDonald
Filed: 29 Oct. 1999	)	
For: Thin film formation, use of sputtering	)	

Attorney Docket No. 9792486-0100

RECEIVED
JAN 0 3 2003
TC 1700

APPELLANTS' BRIEF ON APPEAL

Dear Sir:

In accordance with the provisions of 37 C.F.R. § 1.192, Appellants submit this Brief in support of the Appeal for the above-referenced application.

I. REAL PARTY IN INTEREST

Due to a series of assignments and changes of names of the assignees, the real parties in interest in the present appeal are the Assignee, Sony Corporation, a Japanese corporation; and the Assignee, Furuya Metal Co., a Japanese corporation. The last Assignment was recorded in the U.S. Patent and Trademark Office at Reel/Frame: 012191/0893, recorded on 24 Sept. 2001.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals and no related interferences.

01/02/2003 JADDO1 00000055 09429719
01 FC:1402 320.00 OP

III. STATUS OF CLAIMS

Claims 17, 18, and 20-24 are pending in this case, of which claims 17 and 21 are independent.[1] The present appeal is directed to these claims, which were finally rejected on 26 April 2002, for which an Amendment After Final was filed on 24 July 2002. The Amendment After Final was entered for the purposes of appeal in the Advisory Action dated 20 Aug. 2002. An appeal was timely filed on 24 Oct. 2002.

Based on the entry of the Amendment After Final but without substantive commentary in the Advisory Action, the continued rejections are assumed to be based from and detailed in the Final Office Action.[2] The Appellants therefore appeal on the basis of the claims as submitted in the Amendment After Final and argues the allowability of those claims in reference to the Advisory Action and the Final Office Action.

The claims are being rejected by combinations of Hatwar, Takeoka, and Ohno as follows:

A. Claims 17 and 18 are rejected under section 103(a) as being unpatentable over Hatwar (5,948,497) in view of Takeoka (4,647,947)

B. Claims 19 and 20 are rejected under section 103(a) as being unpatentable over Hatwar in view of Takeoka in further view of Ohno (6,004,646).

C. Claims 21-24 are rejected under section 103(a) as being unpatentable over Ohno in view of Takeoka.

---

1 The claims are appended in Appendix 1.

2 The applicant note that even though MPEP §1207 requires the Examiner to set forth detailed rejections of the claims in the Advisory Action, even when the Amendment would only be entered for the purposes of appeal, the Advisory Action contained no such detail. Accordingly, the applicants must assume that the claims in the Amendment After Final are rejected on the same bases outlined in the last and Final Office Action.

IV. STATUS OF AMENDMENTS

This application has undergone a series of Office Actions, Responses, and RCE's. Initially presented were claims 1 to 9, of which claims 1, 3, 5, and 7-9 were independent. Due to a restriction, claims 3-6 and 8-9 were divided out and remain in reserve for a subsequent divisional application, if necessary. Through a series of Office Actions and Responses thereto, the applicants canceled certain claims and added new claims. When the last Amendment After Final (dated 24 July 2002) was entered upon filing the Notice of Appeal, claim 19 is assumed to be canceled. Claims 17, 18, and 20-24 are pending in this case, of which claims 17 and 21 are independent. All amendments are therefore entered and are of record.

V. SUMMARY OF INVENTION

The invention generally relates to optical disks (such as Compact Disks or Digital Versatile Disks) and the methods and materials used to make the disks (Spec. pg. 1). Disks have a film coating on the pits or bumps that are capable of reflection. The material for the coating is chosen for its ability to have desirable reflectance values, cost, and durability (such as corrosion resistance, or long shelf life, or long term stability) (Spec. pg. 1). Aluminum (Al) or alloys thereof are currently used because Al has some desirable reflectance capabilities and costs much less than gold, which has high reflectance but high cost (Spec. pg. 2). But Al suffers from the serious drawbacks of not having a high enough reflectance. Silver (Ag) has good reflectance but is very susceptible to corrosion and hence the product life is quite short (Spec. pg. 2). Alloys of the above have resulted in poor reflectance to obtain cheap costs, or high costs to achieve high reflectance (Spec. pg. 2).

The daunting quest undertaken and successfully completed by the inventors involved finding a material that had excellent reflectance, achievable in a cost conscious fashion, that was durable, and that had desirable fabrication ease.

The inventors solved the problems associated with the prior materials by inventing a method of forming the thin film using silver-palladium alloys in precise amounts and irradiating the film at precise wavelengths (Claim 17, Claim 21).

VI. ISSUES

The issues on Appeal are as follows:

A. The Examiner cites *In Re Aller* for the proposition that, "it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the portion of the prior art's range which is within the applicant's [sic, applicants'] claims because it has been held to be obvious to select a value in a known range by optimization for the best results." Hatwar does not teach a range of a wavelengths as it only teaches one very specific wavelength. That wavelength is not the same as the applicants' claimed wavelength and applicants do not claim a range of wavelengths, much less claim a range wavelengths that include the Hatwar wavelength. Did the Examiner misconstrue *In Re Aller* in determining if the disclosed wavelength of Hatwar could be routinely modified to arrive at the claimed wavelength?

B. The claims call for precise atomic percent (atm%) of the constituent molecules in an alloy. The prior art discloses over 17 chemical molecules but utterly fails to identify which molecule would be chosen and whether that molecule can "obviously" be made in the precisely claimed atm% to arrive at the claimed invention. Did the examiner err in rejecting the claims when there is no motivation, suggestion, or teaching on which element to pick and which alloy to make and what atm% to use in the alloys?

C. Did the examiner err in rejecting:

(i) Claims 17 and 18 under section 103(a) as being unpatentable over Hatwar (5,948,497) in view of Takeoka (4,647,947);

(ii) Claims 19 and 20 under section 103(a) as being unpatentable over Hatwar in view of Takeoka in further view of Ohno (6,004,646); and

(iii) Claims 21-24 under section 103(a) as being unpatentable over Ohno in view of Takeoka.

VII. GROUPING OF CLAIMS

All claims do not stand or fall together. Appellants specifically argue the patentability of each claim.

VIII. ARGUMENT

A.1. The Issue:

The Examiner cites *In Re Aller*, 220 F.2d 454, 105 USPQ 233 (CCPA 1955) for the proposition that, "it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the portion of the prior art's range which is within the applicant's claims because it has been held to be obvious to select a value in a known range by optimization for the best results." Hatwar does not teach a range of a wavelengths as it only teaches one very specific wavelength. That wavelength is not the same as the applicants' claimed wavelength and applicants do not claim a range of wavelengths, much less claim a range wavelengths that include the Hatwar wavelength. Did the Examiner misconstrue *In Re Aller* in determining if the disclosed wavelength of Hatwar could be routinely modified to arrive at the claimed wavelength?

A.2. The Argument

The Examiner cites *In Re Aller* for the proposition that, "it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the portion of the prior art's range which is within the applicant's claims because it has been held to be obvious to select a value in a known range by optimization for the best results." (Final Office Action, 26 April 2002, pg. 3-4). Hatwar does not teach a range of a wavelengths. In fact, Hatwar only teaches one wavelength of 780 nm. (See, Hatwar Fig. 2; col. 2, line 30; col. 2, line 42). Hatwar specifically teaches that this 780 nm wavelength is the "typical operating wavelength" used in the art (Hatwar, col. 2, line 30, emphasis added). That is, this 780 nm wavelength is identified as the normal wavelength at which the person of ordinary skill in the art would operate under general working conditions. There is no range of wavelengths taught as general working conditions. That wavelength is not the same as the applicants' claimed 650 nm wavelength. The applicants do not claim a range of wavelengths, much less claim a range wavelengths that include the Hatwar wavelength. There is no overlap of the 650 nm wavelength with the Hatwar wavelength. This is a different situation than *In Re Aller* where it was held that routine skill would occur to find optimized ranges from within a disclosed range. Here, that is no disclosed range present.

In addition, although the Examiner cites *In Re Aller* for that proposition, the applicants respectfully argue that the Examiner is misreading and misapplying the *In Re Aller* case. As mentioned above, this case stands for the proposition that if a range is disclosed in the prior art, the later applicant cannot merely claim a range within the prior art range unless improvements or unexpected results can be shown. *In Re Aller*, 220 F.2d at 456, 105 USPQ at 235. However in that same passage, the Court noted that the potentially claimed range refers to a range already disclosed in the art. It does not hold that the later claimed range is always obvious (unless

unexpected results, etc. are shown) when there is no range disclosed in the art. See, *In Re Geisler*, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997). The Hatwar reference does not teach a range. It teaches a specific wavelength only. Hatwar fails to teach or suggest that an ordinary artisan would be motivated to move the 750 nm wavelength downward towards 650 nm.

Thus, the Examiner did not show that: (a) a range was found in the art; (b) the applicants attempted to claim a range; and (c) the applicants' specific wavelength was within the range disclosed in the prior art. It is incorrect to assert that merely claiming a specific wavelength in relation to a prior art disclosure of the absence of an express disclosure of a broader range in the art is *prima facie* obvious.

Accordingly, because Hatwar teaches only one specific wavelength, that that wavelength is expressly identified as the general working condition, that no other wavelengths are described to also be general working conditions, and that Hatwar fails to suggest that this wavelength can be reduced to 650 nm, the reliance on *In Re Aller* is misplaced and thus provides no evidentiary support to modify Hatwar to arrive at the claimed invention.

B.1. The Issue:

The claims call for precise atomic percent (atm%) of the constituent molecules in an alloy. The Takeoka prior art discloses over 17 chemical molecules but utterly fails to identify which molecules would be chosen to make the alloy and whether those molecules can "obviously" be made in the precisely claimed atm% to arrive at the claimed invention. Did the examiner err in rejecting the claims when there is no motivation, suggestion, or teaching on which element to pick and which alloy to make and what atm% to use in the alloys?

B.2. The Argument

Takeoka teaches the cover film 52 to be one of the 17 recited elements, or some combination thereof (Takeoka, col. 7, lines 51-68). First, it only briefly mentions that alloys can be made and certainly does not teach with the specificity necessary to arrive at the claimed proportions. There are too many combinations of the 17 elements to make in a 1 to 1 combination irrespective of varying the constituents by the claimed proportions. The task becomes Herculean when one considers that Takeoka is not limited to two-metal alloys and thus may include two-plus metal alloys up to 17 metal alloys. The proportions of the claimed invention provide unique reflectivity results that are not suggested or taught that can occur from combining any of the 17 elements recited. The allegation of mere skill is required is simply not true given the undue experimentation necessary to arrive at the claimed combination. Differences would have profound consequences on the reflectivity as shown in Hatwar FIG. 2 (showing the profound difference that incremental %'age compositions would have) and Takeoka FIGs. 9 and 10 (showing how thicknesses will significantly vary the signal modulation).

Takeoka specifically teaches that thicknesses matter and that if too thick, the absorption becomes too great and reflectance decreases. So to keep the thickness lower, Takeoka uses gold film to compensate for the decreased reflectance given that gold has a high reflectance. This teaches away from the claimed invention in that the invention teaches modifying the proportions of non-gold alloys to achieve a desired reflectance. The use of gold is highly undesirable due to its acknowledged cost prohibition. See Hatwar, col. 1, lines 10-40.

Furthermore, Takeoka teaches that in exchange for gold, one can use non gold alloys of a particular type. Takeoka's experiments clearly show a favor to a Te-X-Y where the experiments only change the metal X or metal Y, leaving Te as the desired anchor metal. So, this teaches against using Ag or Pd and then modifying these metal alloys to arrive at a suitable reflectance.

Takeoka's experiments clearly show that his approach to a more suitable reflectance is the use of gold, or using a Te-X-Y alloy.

To this end, it is not possible to predict that the Takeoka reference would be capable of utilizing the single target of sputtering the precise alloy composition because there is no indication that the precise alloy composition can be done or that Hatwar's alloy composition can be sputtered via the same techniques of Takeoka. Accordingly, there is no motivation to combine the references.

C.1. This Issue:

Did the examiner err in rejecting:

(i) Claims 17 and 18 under section 103(a) as being unpatentable over Hatwar (5,948,497) in view of Takeoka (4,647,947);

(ii) Claims 19 and 20 under section 103(a) as being unpatentable over Hatwar in view of Takeoka in further view of Ohno (6,004,646); and

(iii) Claims 21-24 under section 103(a) as being unpatentable over Ohno in view of Takeoka.

C.2. The Argument

C.3.(i).

Claims 17 and 18 recite, a method of forming a thin film comprising the step of:

(a) forming an AgPd alloy thin film using a sputtering target material,

(i) the AgPd alloy thin film comprising Pd in an amount ranging from 0.5 to 4.9 atomic %, and

(ii) Cu in an amount ranging from 0.1 to 3.5 atomic %; and

(b) irradiating an information recording layer with a light beam having a wavelength less than or equal to 650 nm.

18. The method of claim 17, wherein the thin film has a thickness from approximately 500 Angstroms to approximately 1500 Angstroms.

As understood by the applicants, the Examiner asserts that the method is taught primarily by Hatwar's description of the precise alloy composition (assuming that the wavelength is also modifiable from Hatwar) combined with Takeoka's contribution that one can sputter an alloy of AgPd (irrespective of the precise composition).

This assertion fails for the above reasons and for the reasons below. First, the ranges of the Pd and Cu disclosed in Hatwar, while somewhat overlapping with the claimed ranges, is specifically taught that the more the Pd or Cu there is in the alloy, the more increase in "environmental stability without significantly compromising the optical properties in the reflective layer." (Hatwar, col. 1, lines 66 to col. 2, line 1). To this end, Hatwar teaches proportions of Pd and Cu that are almost three to ten times respectively more than the claimed ranges. Hatwar teaches a preferable composition having about 10-15 atm% Pd and about 20-30 atm% of Cu. But the applicants specification points out the drawback of having too much Pd because it may increase the amount of hydrogen contamination (Spec. pg. 10).

Second, the Hatwar reference teaches that increasing the Pd content improves the corrosion resistance at the expense of the reflectivity (Hatwar, col. 3, lines 28-31). Accordingly, Hatwar's problem to solve is how to increase durational stability and solves this problem using increased Pd content. On the other hand, the applicants' problem is balancing the desire for increased reflectivity at the expense of durational stability.

Because the problem identified by the applicants is different from the problem identified by the prior, and that the solutions proposed are different, this is very strong evidence of

nonobviousness. See, *In Re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from ... the nature of the problem to be solved", indicating that different problems and solutions are strong evidence of nonobviousness.

Third, even Hatwar, the most recent reference cited, clearly states that Hatwar does not appreciate how the materials work or what the properties of the materials are that make them work (Hatwar, col. 3, lines 36-37). To this end, an artisan reading Hatwar would not be motivated to look at Takeoka simply for sputtering techniques because the artisan would not have a clear understanding of how the materials work, how they will be deposited, and whether they will adhere to the substrate. Taking these uncertainties, Takeoka does not solve or sufficiently teach one to sputter out the precise formulations in a manner consistent with the uncertainties just described. This is more problematic when Hatwar's (the most recent reference) expresses uncertainties that must be evaluated in conjunction with the older techniques taught in Takeoka.

Finally, Takeoka essentially deals with the problem associated with creating a recording layer that will adequately absorb enough energy to bubble up and cause a "bump" or "pit" in the CD. The bubble forms under a metallic cover (identified as cover film 52 of FIG. 6). The thrust of the disclosure about the cover film 52 involves identifying 17 elements, then simply stating that some elements are more desirable than others, that the elements may be alloys, and then that the elements may be deposited using a sputtering technique (Takeoka, col. 7, lines 52-68). Recognizing that the thrust of the disclosure involves recording layer media, there is little to no disclosure about how an artisan would be able to sputter the precise formulation of Hatwar via the non-disclosed sputter techniques of Takeoka. Furthermore, any disclosure of precise sputter techniques is limited to sputtering to achieve the result of the cover film not being to thick as to

retard formation of the underlying bubble or not being too thin as to cause a rupture of the film by the underlying bubble (Takeoka, col. 7, lines 51- col. 8, lines 8). There is simply no indication that alloy composition is important and that the Takeoka sputtering technique would be routinely adapted to sputter the precise Hatwar formulation.

In sum, the independent claims are not obvious because there is teaching away of the precise alloy composition, that the problems and solutions identified by the art are sufficiently different that an ordinary artisan would not be motivated to combine them, that the 17 metals disclosed give no indication that the Hatwar formulation may be sputtered easily or routinely; and that Hatwar itself recognizes that given the uncertainties of the alloys used, too much uncertainty would exist in whether the alloy could be sputtered in the manner taught by Takeoka, if at all.

C.3.(ii)

Claims 19 and 20 are rejected under section 103(a) as being unpatentable over Hatwar in view of Takeoka in further view of Ohno (6,004,646). Claim 19 is canceled and the rejection is moot. For the same reasons discussed above, claim 20 is not rendered obvious. Ohno concerns the problem associated with recrystallization in CD-RW discs. The present invention is associated with the problem of increasing reflectance or stabilizing reflectance to reduce jitter. Ohno at best teaches that a wavelength of 630 to 660 nm is used to irradiate the disk for recrystallization. It suggests nothing about using this wavelength to combat reflectance. In fact that section recited by the Examiner specifically suggests that the wavelength is chosen to provide the groove depth desired, not hone reflectance. (see col. 19, lines 5-20: "For this purpose, it is necessary to make the groove depth shallow …").

For these reasons, Ohno is not combinable with Hatwar and Takeoka as they approach different problems using different solutions. See *In Re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from … the nature of the problem to be solved" indicating that different problems and solutions are strong evidence of nonobviousness).

Furthermore, the choice of wavelength indicates the quantum of energy delivered. As Takeoka notes, the quantum of energy delivered to the recording layer is of extreme importance. Takeoka also teaches that the cover film thickness and composition must be fabricated in such a manner as to permit the recording layer media to bubble up and create a bump in the cover film. Ohno's disclosure of a wavelength of 650 nm provides no indication that that wavelength will impart a sufficient quantum of energy to achieve bubbling in the recording material of Takeoka and that the Hatwar specific cover film composition will permit such a bump to be made. Quite simply, there are too many variables at work and that there is no indication that Ohno's wavelength will work to impart energy if the film thickness is 500 to 1000 Angstroms. It is noted that Ohno's cover film is only described in the range of 100-200 Angstroms (see, e.g., Ohno, col. 21, line 59). This would be consistent with Ohno having a thinner cover film so that recrystallization and erasability is maximized, and with Takeoka that a thinner film is desirable so that bumps may occur.

Because Ohno is directed to recrystallization, that modification would be directed to combating recrystallization, not reflectance, and that there is no indication that Ohno's wavelength could work in the proposed modification, accordingly, there would be no motivation to modify the 630 to 600 nm range in combination with the other references.

C.3.(iii)

Claims 21-24 are rejected under section 103(a) as being unpatentable over Ohno in view of Takeoka. For the same reasons above, claims 21 to 24 are patentable over the art.

IX. Conclusion

The applicant having argued the impropriety of the references, the applicant requests that the Board reverse the finality of the last Office Action. The applicants request remand to the Examiner with a decree to move the application and claims to allowance.

Respectfully submitted,

Dated: December 23, 2002

By: Shashank Upadhye

Shashank Upadhye, Reg. No. 48,209
SONNENSCHEIN NATH & ROSENTHAL
P.O. Box 061080
Wacker Drive Station, Sears Tower
Chicago, Illinois 60606-1080
(312) 876-2622

APPENDIX 1

Claims on Appeal

17. A method of forming a thin film comprising the step of: forming an AgPd alloy thin film using a sputtering target material, the AgPd alloy thin film comprising Pd in an amount ranging from 0.5 to 4.9 atomic %, and Cu in an amount ranging from 0.1 to 3.5 atomic %; and irradiating an information recording layer with a light beam having a wavelength less than or equal to 650 nm.

18. The method of claim 17, wherein the thin film has a thickness from approximately 500 Angstroms to approximately 1500 Angstroms.

20. The method of claim 17, wherein the thin film has a thickness from approximately 500 Angstroms to approximately 1500 Angstroms; and wherein the wavelength is less than or equal to 650 nm.

21. A method of forming a thin film comprising the step of: forming an AgPdTi alloy thin film using a sputtering target material, the AgPdTi alloy comprising Pd in an amount ranging from 0.1 to 1.5 atomic %, Ti in an amount ranging from 0.1 to 2.9 atomic %, and Cu in an amount ranging from 0.1 to 3.5 atomic %.

22. The method of claim 21, wherein the thin film has a thickness from approximately 500 Angstroms to approximately 1500 Angstroms.

23. The method of claim 21, wherein the wavelength is less than or equal to 650 nm.

24. The method of claim 21, wherein the thin film has a thickness from approximately 500 Angstroms to approximately 1500 Angstroms; and wherein the wavelength is less than or equal to 650 nm.